

Bioarchaeological evidence of violence in ancient Mesopotamia

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Abstract: *The paper reviews available evidence of violence-related traumatic injuries observed in archaeological human skeletons from Mesopotamia, confronting them with available textual and iconographic evidence. Scatters of human remains were found in destruction layers of a few sites dated to several chronological periods, such as Tuttul (Old Babylonian period), Nineveh, Aššur (Neo-Assyrian period) and Dura Europos (Roman/Sasanian period). There were also earlier mass burials with evidence of violence (Tell Majnuna, Tiriş Höyük). Moreover, possible violence-related trauma has been observed at several regular cemeteries. The frequency of healed cranial traumas decreased at the beginning of the 2nd millennium BCE, and this shift may be related to major changes in the art of war that occurred during that time and specifically to higher reliance on professional soldiers. Apart from warfare, the evidence for other kinds of violence in Mesopotamia is very rare. Although the textual evidence of violence is abundant, especially in the Old Babylonian (ca. 1800–1600 BCE) and in the Neo-Assyrian period (ca. 900–600 BCE), the actual frequency of traumatic lesions in skeletons from Mesopotamia is lower than in the surrounding regions, producing a picture of a peaceful society, especially during the Early and Middle Bronze Age.*

Key words: trauma; injuries; palaeopathology; taphonomy; warfare; weaponry; Syria; Iraq

Introduction

The nature of human aggression and violence has always been a hot topic in philosophy (Montagu 1976), anthropology (Wrangham & Peterson 1996), ethology (Lorenz 1974, 1983) and psychology (Anderson & Bushman 2002). This discussion was usually organised around the question of whether aggression, violence and warfare are a part of human nature or something acquired in the course of education and cultural transmission. More recently, this ‘nature versus nurture’ dichotomy has been

contested (Sussman 2013), although still its variants, such as the myth of the noble savage (Keeley 1997) and the myth of progress (Pinker 2011), heavily influence the modern views of aggression in past human groups. On the other hand, the need for careful contextualization of violence in local social, economic and environmental settings is explicitly expressed by many authors over the past decades (e.g., Milner 1999; Jackes 2004; Thorpe 2005; Martin & Harrod 2015; Buikstra et al. 2022; Osterholtz et al. 2023).

Although violence may be defined in various ways and some authors understand this term very broadly, including even social and economic inequalities, which are referred to as structural violence (Martin & Harrod 2015), the basic definition assumes the use of physical force that may lead to injury or death of the victim (cf. Krug et al. 2002). Violence defined in this way (sometimes called direct violence) may leave some traces on human bones, and indeed many bioarchaeological papers deal with violence-related trauma (see Martin & Harrod 2015 for a literature review). In the literature, two extreme opinions may be found, with Phillip Walker (2001), who argued that palaeopathological research offered better insight into the pattern of violence in past human groups than historical or archaeological sources, and Mary Jackes (2004), who was much more sceptical towards the interpretation of skeletal evidence of in-

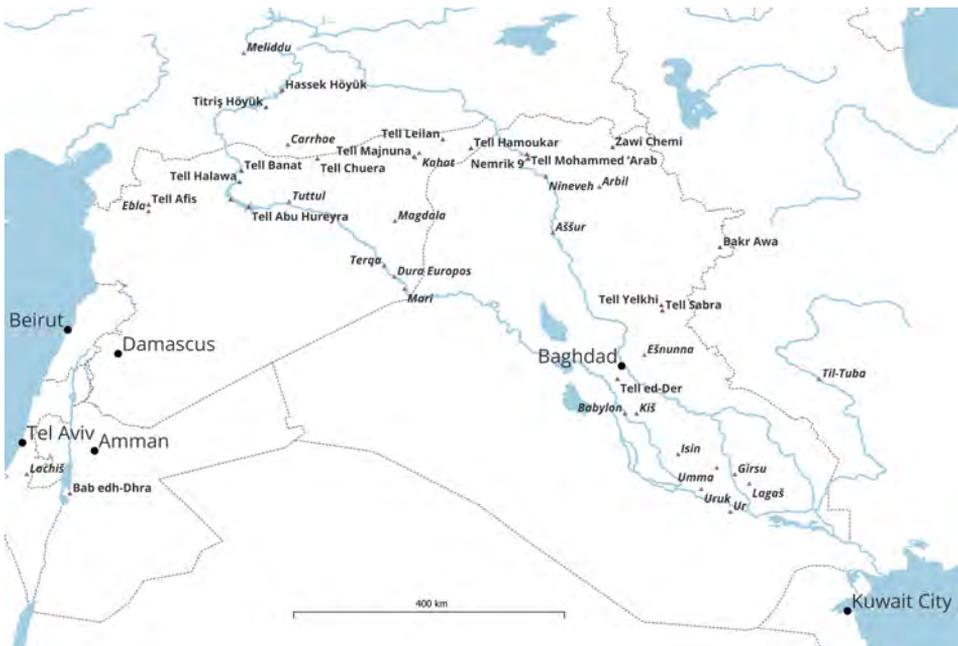


Figure 1. Map of Mesopotamia showing the location of sites mentioned in the paper. Ancient names marked by italics. Drawing by Arkadiusz Sołtysiak.

Table 1. Simplified chronology of Mesopotamia.

Period	Archaeological chronology	Historical chronology (southern alluvium)
10000–8700 BCE	Pre-Pottery Neolithic A	
8700–6800 BCE	Pre-Pottery Neolithic B	
6800–5500 BCE	Late Neolithic	
5500–3200 BCE	Chalcolithic	Uruk (ca. 3700–3100 BCE)
3200–2100 BCE	Early Bronze Age	Jemdet Nasr (ca. 3100–2900 BCE) Early Dynastic (ca. 2900–2350 BCE) Akkadian (ca. 2350–2200 BCE)
2100–1500 BCE	Middle Bronze Age	Ur III (ca. 2100–2000 BCE) Isin-Larsa (ca. 2000–1800 BCE) Old Babylonian (ca. 1800–1600 BCE)
1500–1200 BCE	Late Bronze Age	Kassite / Middle Assyrian (ca. 1600–1200 BCE)
1200–550 BCE	Iron Age	Neo-Assyrian (884–612 BCE) Neo-Babylonian (612–539 BCE)
550 BCE – 200 CE	Classical Antiquity	Achaemenian (539–330 BCE) Hellenistic (330–141 BCE) Roman / Parthian (141 BCE – 224 CE)
200–650 CE	Late Antiquity	Sasanian (224–637 CE)
650–1500 CE	Islamic Period	Umayyad (637–750 CE) Abbasid (750–1258 CE) Ilkhanid (1258–1353 CE) Jalayirid (1353–1411 CE) Turkoman (1411–1501 CE)
since 1500 CE	Modern Period	Safavid (1501–1534 CE) Ottoman (1534–1920 CE)

juries. However, even if the bioarchaeological evidence of violence must be treated with caution, it still has the potential to provide some insight into the behaviour of past human groups, especially when combined with historical background or archaeological evidence of defensive structures in human settlements (Milner 1999; Arkush & Tung 2013).

For the first sight, ancient Mesopotamia is a perfect region for studies on the history of violence, as the place where farming and urban life were invented earlier than elsewhere, textual evidence reaches back late 4th millennium BCE, there are many records of military actions since the second half of the 3rd millennium, and archaeological excavations during past 150 years revealed remains of many sites, including these with purported traces of violent destruction. On the other hand, however, research on human remains has been less-established than in Europe, North America, or even Egypt. Before 2005, fewer than a hundred, usually short, bioarchaeological reports were published (Sołtysiak 2006), and for fewer than 50 sites, any data on paleopathology were available (Sołtysiak 2012). This number has increased rapidly during the past two decades, but it is still much less than may be expected, also due to the political instability in the region. For that reason, papers on violence-related injuries in Mesopotamia are often limited in scope and depth (cf. Rathbun 1984; Erdal 2012; Sołtysiak 2017). This is contrasted with many books and papers about warfare in

Mesopotamia, especially during the Neo-Assyrian period, for which both textual and visual sources (including iconography and artifacts) are abundant (e.g. Malbran-Labat 1982; Mayer 1995; Bahrani 2008).

Mesopotamia consists of two distinct parts: the southern alluvium of the Euphrates and Tigris, where irrigation was introduced as early as the Late Neolithic (see **Table 1** for regional chronology), and the northern plains where dry farming and animal herding in the steppe were possible (Postgate 1994). The geographical scope of the present paper covers both parts of Mesopotamia, and it may be defined as the whole lowland drainage area of the Euphrates and Tigris, i.e. the whole territory of contemporary Iraq, the eastern part of Syria and a strip of south-eastern Turkey (**Figure 1**). In terms of chronology, all available collections of modern *Homo sapiens* remains are included, irrespective of their dating.

In this paper, the available bioarchaeological evidence of violence, scattered in various publications and in some unpublished datasets, will be collected together and confronted with historical and archaeological sources to check whether the research on human skeletons may add anything to our knowledge about human behaviour in ancient Mesopotamia. The text is divided into three parts. The first part provides the general background of the research on violence in bioarchaeology. The second one offers an outline of the archaeological and textual evidence of violence in Mesopotamia. It is not intended to provide a complete review of available sources, which is far beyond the scope of the present article, but rather to discuss these aspects of violence that may be potentially contrasted with the bioarchaeological sources, as evidence of various violence types, the historical account of military actions, review of available weaponry and estimation of the number of people engaged in violent conflicts. Finally, the third part discusses available bioarchaeological evidence of violence in ancient Mesopotamia, from family and intra-societal violence to high-scale conflicts witnessed by the mass burials. Also, the evidence of specific trauma is presented and analysed in detail. The overarching question is how far the picture of violence based on the textual evidence, and especially on the royal propaganda that highly valued the military superiority of Mesopotamian states, is reflected by the evidence from the skeletons of real (usually common) people.

Methods of research

The definition of interpersonal violence is somewhat blunt. Usually, it denotes the act of aggression leading to physical harm (Allen & Anderson 2017), although symbolic or ritual violence lacking this physical dimension is also considered, especially in anthropology and political studies (Kerr et al. 2024; Kitts 2018). Here, however, the term of violence has to be defined in a way compatible with the bioarchaeological

evidence, i.e. as the act of aggression leading to death or at least to the development of identifiable skeletal trauma (Redfern 2017).

Violence is widespread in human interactions. Based on its societal scope, it is possible to distinguish between domestic violence, violence within a society (e.g., criminal acts, but also measures of social control) and violence between societies, including military conflicts. Although there are some specific skeletal indicators of domestic violence (see below), usually it is impossible to distinguish between intra- and inter-group violent behaviour based on bioarchaeological evidence, and only the archaeological context may be indicative in some cases. The same refers to the distinction between legitimate and illegitimate violence, which is sometimes difficult even in modern societies (Ball-Rokeach 1972).

Males are more frequently involved in interpersonal violence acts, both as attackers and as victims; young males prevail especially in military actions (Walker 2001). In contemporary societies, facial trauma is more common in males than in females, and this frequency ranges from 75% to more than 90% (Jurmain & Kilgore 1998). On the other hand, violence against children and women may also be noted, and some clinical syndromes were defined based on modern medical cases, such as Likely Caregiver-Induced Violence (LCIV) and Intimate Partner Violence (IPV).

LCIV is observed mainly in infants up to three years old, and the syndrome includes such symptoms as cranial bone fractures, long bone fractures (especially femur), rib fractures, endocranial bone deposition due to subdural hematomas, and subperiosteal new bone formation (Walker et al. 1997; Buckley & Whittle 2008; Gaither 2012). Three indicators are especially useful in the diagnosis of LCIV: (1) multiple injuries over the course of the lifetime, (2) fractures to the same bones of specific areas of the body, (3) fractures that do not heal because of repeated injury to the same location (Brogdon et al. 2013; Martin & Harrod 2015). Although relatively easy to recognise, LCIV is very rare in the archaeological record (Walker 2001), and some have even argued that this kind of violence is more prevalent in contemporary societies than it was in the past (Walker et al. 1997). The point is, however, that childcare is highly variable between cultures, and the modern forensic cases may not be completely relevant to the patterns of child abuse in societies with different cultural attitudes towards juveniles (Lewis 2017: 119).

On the other hand, IPV has been observed in several archaeological collections (Walker 2001). This syndrome concerns women and includes mainly facial injuries, especially nasal bone fractures, and to a lesser extent also injuries to hand phalanges (de la Cova 2012).

LCIV and IPV may be classified as the specific syndromes of domestic violence, but it is possible to define two other social levels of violence: ultra-domestic intra-group violence (including criminal acts, governance, riots, and ritual behaviour) and

inter-group violence (especially military actions) (cf. Martin & Harrod 2015). Practically, it is also possible to distinguish between offensive and defensive injuries, although the former are much less common and include exclusively hand injuries, such as a boxer's fracture and Bennett's fracture of metacarpals (Jurmain et al. 2009). The defensive injuries are much more variable, and most specific types are cranial lesions, multiple lesions in the postcranial skeleton, especially so-called parry fractures in the ulna (Judd 2006), nasal fractures, and projectiles embedded into bone (Jurmain et al. 2009; Steadman 2008). If multiple injuries are observed in a skeleton, their random distribution may suggest that an individual was subject to a surprise attack or took part in a chaotic battle, while ritualised violence should leave a more predictable pattern of trauma (Tung 2007; Steadman 2008).

Blunt and sharp force trauma

Violence-related lesions may be differentiated according to the type of weapon, and often at least blunt force may be distinguished from sharp force trauma, even if more detailed identification is difficult when only bones are available (Jurmain et al. 2009).

Based on modern forensic cases, cranial fractures are the most commonly associated with violence, although they may also result from some accidents (Guyomarc'h et al. 2010). They differ in shape and may be the result of both sharp and blunt force, e.g. swords, axes, arrowheads, maces or slingstones. Stone missiles usually affect a larger area than hand weapons (Bhootra & Bhana 2004), and this may be the cause of observed differences between sites in average dimensions of cranial trauma (Judd 2006). Another kind of injury conventionally associated with blunt force attack is the transverse fracture of the ulnar shaft or fifth metacarpal, interpreted as 'parry fractures', although again they may be related also to a fall onto ground or a straight edge (Judd 2008; Jurmain et al. 2009).

Sharp force trauma is often easier to identify as there are clearer diagnostic criteria, based also on modern experiments (Humphrey & Hutchinson 2001; Lynn & Fairgrieve 2009), and sometimes it is possible to distinguish between incised, penetrating and chop wounds (Wenham 1989; Boylston 2000; Kjellström 2005; Mitchell et al. 2006; Jordana et al. 2009). However, even in that case, identification of the type of weapon is usually only a matter of speculation. A rare and unequivocal category of penetrating wounds is projectiles still embedded in bone.

Antemortem and perimortem trauma

The most important element in the diagnosis of violence-related trauma is differentiation between antemortem (i.e., healed), perimortem (i.e., lethal in many cases) trauma and postmortem damage. Although the initial inflammation in the wound area may

be mistaken with some taphonomic effects, later stages of an osteogenic reaction are often easy to recognize (Walker 2001; Moraitis & Spiliopoulou 2006), and therefore the identification of antemortem trauma is reliable even if the estimation of time between traumatic event and death of an individual is usually rather imprecise (Ragsdale et al. 1981; Sevitt 1981; Maples 1986; Frost 1989; Barbian & Sledzik 2008).

Much more problematic is the differential diagnosis of perimortem trauma (Cappella et al. 2014). On one side, any signs of healing become visible after at least a week or sometimes after several weeks following the injury, and—on the other side—postmortem damage to a bone with much collagen preserved (i.e., ‘wet bone’) may be identical with non-healed trauma in a living individual. So, in this context, the term ‘perimortem trauma’ should be applied to any bone damage which occurred in a period from several weeks before to several weeks or even months, if not years, after the death of an individual (Walker 2001).

The differentiation between perimortem trauma (even defined most broadly) and postmortem damage is difficult, especially in fragmented and eroded bones. There are, however, several more or less reliable criteria based on the characteristics of the fractured edges, such as: (1) colour of the fracture surface, (2) peeling, (3) angle of the fractured margins, (4) presence of attached fragments, (5) radiating fracture lines (Jordana et al. 2009; Knüsel & Robb 2016). Also, a mechanical difference may be considered: apart from damage during excavation, postmortem modifications (e.g., excarnation) are usually parallel and not perpendicular to the bone surface (Smith & Brickley 2004). It also refers to scalping, which usually occurs after the death of a victim, but some healed examples are also known (Steadman 2008).

There are two categories of archaeological contexts where observed perimortem damage is likely related to violence: mass burials of people slain during a battle (e.g., the deposit associated with the battle of Towton, Fiorato et al. 2007) and scattered unburied bodies in ruins of a captured site. However, if no historical documents are associated with the event, proper identification of such archaeological deposits may be quite risky and open to speculation. Moreover, the discovery of mass violence-related deposits of skeletons is a matter of chance and cannot be taken as representative of the studied human group.

Interpretation biases

Any interpretation of violence-related trauma in past human groups is biased by several factors. First, the differential diagnosis of antemortem, perimortem and postmortem damage is sometimes based on superficial criteria or even against available protocols (cf. discussion in Tomczyk et al. 2011 and Sołtysiak 2014). Even if the differential diagnosis was careful, any damage interpreted as perimortem trauma may indeed be the result of burial customs or mutilations of a dead body (Haverkort &

Lubell 1999; Pérez 2012) and especially in secondary deposits of commingled bones, it may be extremely difficult to identify perimortem trauma correctly (Pérez 2012).

Second, the frequency of injuries observed on bones may be weakly correlated with the intensity of violent behaviour in a studied human group, as this depends on available weaponry and also on martial arts, and especially body part selection as a target for a strike (cf. Brink et al. 1998). In a specific case of arrowheads, there are three possibilities: (1) they may be embedded into bone, (2) they may leave a mark on bone, and (3) they may remain in the soft tissue of a buried body. Only the first category is unequivocal evidence of interpersonal violence, as arrowhead marks on bone usually are not specific or modified by taphonomic agents, and the arrowheads close to the excavated skeleton may be a part of grave goods or accidental inclusion in the burial fill, especially in societies that highly valued martial skills (Milner 2005).

Third, the presence of antemortem and perimortem trauma should be interpreted differently, as antemortem trauma occurs in survivors, while perimortem trauma is present in non-survivors. It means that even a high frequency of antemortem trauma does not necessarily indicate that the level of violence was high in a local group: survivors could move for a long distance between the time of their injury and death, and there are many potential social factors leading to selective burial (e.g., specific cemeteries for soldiers). On the other hand, a high frequency of perimortem trauma would be theoretically the indication of local violence, although it was also possible that the bodies of the fallen were transported back home by surviving comrades (Jackes 2004).

All these problems heavily limit our ability to assess the real prevalence of direct violence in past human societies. One exception is the study of human remains that are clearly linked to a historical event, and in this case, bioarchaeology may add some details to existing knowledge based on textual sources or iconography. Another approach is to study the frequencies and distributions of cranial trauma in large datasets to look for potential chronological or regional patterns.

Textual and archaeological evidence

The history of inter-group violence in ancient Mesopotamia is relatively well known, as several kings not only described their military actions, but also depicted them, even if in a very conventionalised way (Barron 2010) and with a clearly biased approach driven by propaganda (Nadali 2017). Also, archaeological excavations provided many examples of weapons and layers of destruction that might be associated with military actions. However, this evidence is not uniformly distributed, and we know, for example, much more about Neo-Assyrian martial art and military history than about warfare during all other periods in the history of ancient Mesopotamia. Also, textual and archaeological sources concerning domestic, social and ritual violence are rare and

available only in a few isolated locations.

The first part of this section will review all these rare sources, and the following subsections move to much more widespread textual and iconographic evidence of warfare. After a general overview of the history of military conflicts, more specific issues are discussed there, such as the development of weaponry and military formations, army recruitment procedures and treatment of the dead bodies after the battle—all this in the context of possible interpretation of the bioarchaeological evidence.

One potentially useful line of information about inter-personal violence may be medical texts that include some references to wound cleaning and surgery (Scurlock 2007). However, these sources are highly conventional, suggesting that the art of surgery was not very sophisticated in Mesopotamia and lesions were treated conservatively (Adamson 1991), so this line of evidence will not be presented in detail.

Domestic, social and ritual violence

Perhaps the oldest mention of the murder is a letter from Umma, written by Mesag, the governor of this city, to the Akkadian king (Naram-Suen or Šar-kali-šarri). The text reports that a certain Iri-ur hit with a mace and killed someone who is tentatively identified as a Lullubean (i.e. someone who was native to the central Zagros mountains). The governor is not certain how to decide on this case and asks the king for advice (Robson & Zólyomi 2014). In general, the early terms for corporal or capital punishments are ambiguous (Molina 2022).

Domestic and social violence was recorded more abundantly in the sources from the kingdoms of Mari and Babylon during the first half of the second millennium BCE and in the iconography and cuneiform records dated to the Neo-Assyrian period. Corporal punishments in the former period included mutilations, such as eye extraction and tongue cutting, although hard labour jails, enslavement and fines were more common judgements (Bonnetterre 1995). The *Code of Hammurabi* also listed hand cutting and breaking, knocking out a tooth (Harper 1904) and impalement (Richardson 2007), although it is not clear how frequently such punishments were actually performed. In that period, the display of the body of an executed criminal or at least the head was also practised (Richardson 2007). Cruelty was an important aspect of the official policy of the Neo-Assyrian kings about a thousand years later, and many kinds of punishment, including impalement and flaying, were frequently mentioned in royal inscriptions and depicted in the palaces (Radner 2015), but mostly in the context of military actions and to a much lower extent as a measure of social control.

In the Amorite-period Mari archives (dating to the late 3rd and early 2nd millennia BCE), the death penalty could be carried out in several different ways, such as decapitation, impalement, drowning, skull shattering and burning (Bonnetterre 1995). The

executions, however, may have been delayed to a suitable time. For example, when nomads around Mari tried to avoid conscription, the prefect asked the king to execute an imprisoned criminal to exhibit his head as a sign of warning (Bonneterre 1995). Murders were very rarely reported in archives, but there was one account of the severely mutilated remains of a child, which had been fragmented and only the head and trunk were found in the canal (ARM VI, 43; Bonneterre 1995).

Another important, although isolated, corpus of texts mentioning some acts of violence has been found in the Neo-Babylonian and later archive of the Eanna temple in Uruk, more than 1000 years later than the sources from Mari. This corpus includes among others some accounts of trials against criminals, offering insight into the activity of local guards, the organisation of the temple prison and organized crime (Sandowicz 2014; Jursa 2014). Some legal texts from that time mention several ways of execution as death 'by the iron dagger' for an adulteress (Stol 1995), impalement, beheading of rebels, incineration of temple thieves (Jursa 2014). According to the later texts, torture was applied during interrogation (Jursa 2014). One legal document mentions the punishment of cutting off a hand which was ultimately replaced by a high fine (Wunsch et al. 2015).

In the Eanna archive, it is possible to find even sensational stories, such as the criminal activity of the slave Nadin-ahi, who stole a duck offered to the goddess Ishtar and spent two months in a temple jail. He then killed the guard and tried to escape through the roof, but collapsed and broke his leg (Jursa 2014). This and other legal reports show mainly criminal acts of slaves and other members of the lower social class against temple property and temple officials. It is possible that the level of violence between these poor people was also high, but it was beyond the temple administration's scope of interest and noted in tablets only when such conflicts concerned the temple property directly (Jursa 2014).

The texts from the Neo-Babylonian period suggest that social stress was fairly high even in relatively peaceful times in the history of Mesopotamia, and especially travelling between cities was dangerous because of robber gangs and deserters (Jursa 2014). This prevalence of intra-group violence may be, among others, the consequence of mass deportations that were occasionally noted in the sources dated back to late 3rd and early 2nd millennia BCE (Gelb 1973) but became much more common during the 8th, 7th and 6th centuries (Oded 1979). The Neo-Assyrian sources mention the number of 1,200,000 deportees explicitly, but the actual estimated number may be higher than 4 million people (Oded 1979). Such forced migration may have had a negative impact on many aspects of social life, producing tensions and hostility between groups of different origins (cf. McGarry 1998).

Domestic violence was not explicitly reported by the Mesopotamian texts. This does not mean that it was not present, but obviously, relations inside the family were

outside the realm of administrative texts and business letters. There is only one record from Uruk dated to the Achaemenian period, reporting a case when an individual's hands were broken, presumably by a cousin (Jursa & Sandowicz 2023). Two further Neo-Babylonian sources mention violence against unmarried women in their own home, and one text reports abduction of a woman, but the offenders were likely unrelated to the victims, and therefore this was just another kind of criminal activity (Jursa 2014).

Some ritual texts from the later 2nd and 1st millennium BCE described symbolic violence against evil people (Abusch 1974), although no real accounts of anti-witchcraft actions are recorded. Also, mutilation of dead enemies and remains of their ancestors may be classified as a manifestation of ritual violence. It is possible that Elamite invaders burned the bones of the kings of Ur after the capture of this city at the end of the third millennium BCE (Moorey 1977). There is also a depiction of the battle of Til-Tuba found in Nineveh (7th century BCE), where the prisoners of war are forced to grind bones, presumably bones of their ancestors (Bahrani 2008).

The most peculiar kind of ritual violence and human sacrifice in Mesopotamia is the ritual *šar pūhi*, 'king of the substitution', noted frequently in the Assyrian sources from the 7th century BCE (Verderame 2013). When astrologers observed the eclipse of the Moon, according to the traditional series of omens *Enuma Anu Enlil*, the king committed a sin and was sentenced to death by the gods. In that case, the king took the identity of a farmer and a substitute king was enthroned for a hundred-day period. The fate of the substitute is not specified by the sources, but there is a description of rituals related to his burial, so most likely he was killed to fulfil the omen. It is also possible that the substitute king was accompanied by a substitute queen. The correspondence between the king and the astrologers suggests that the ritual *šar pūhi* was implemented at least five times between 679 and 666 BCE (Verderame 2013).

Castration is the act of violence sometimes mentioned by late Mesopotamian sources, and eunuchs acted as important officials in the courts of Neo-Assyrian and Neo-Babylonian kings (Deller 1999). If castration was performed in childhood, it could have some impact on skeletal development (Eng et al. 2010; Belcastro et al. 2011), but the identification of eunuchs based only on their skeletons would not be reliable.

In spite of the relative abundance of the cuneiform texts, the accounts of social and domestic violence are scarce, except for the Old Babylonian and Neo-Assyrian periods, when corporeal punishments were described in detail, and the Neo-Babylonian and Achaemenian periods, due to the discovery of the Eanna archive. However, the available documents and limited iconographic evidence are insufficient to assess the actual scope of violent behaviour within the Mesopotamian societies.

Short military history of Mesopotamia

Any historical sources reporting violence in daily life are scarce and very far from being representative. On the other hand, the history of wars is much better documented, although still available sources are unevenly distributed and heavily distorted by their primary use in royal propaganda, especially during the Neo-Assyrian period, when military aspects of societal control were ostentatiously emphasised.

Some authors argue that warfare was virtually absent in Mesopotamia during the Neolithic and Early Chalcolithic (see **Table 1** for the outline of the chronology), as there are no signs of fortifications nor combat scenes depicted (Stein 1994; Otterbein 2011). However, even if there is no direct archaeological evidence of warfare before the establishment of the first large urban centres and early state formation during the Late Chalcolithic, absence of evidence does not equal evidence of absence. Blood feuds between kin-based groups and conflicts in small communities of farmers may have been as frequent and undetectable for archaeologists as raids of chimpanzees against their neighbours (Wrangham & Glowacki 2012).

The first archaeological traces of destruction were found in strata dated to the very end of the 5th millennium BCE, and the Uruk expansion during the 4th millennium was accompanied by the erection of the first city walls and the depiction of violence in glyptics (Amiet 1980; Stein 1994; Eph'al 2009). Also, possible fire destruction levels were found at Tell Hamoukar and Tell Brak in North Mesopotamia (Lawler 2006; Ur 2010). Conversely, the Late Uruk script still had no specific terms for weaponry or soldiers (Richardson 2016).

The earliest military conflict well described by the sources is the long-lasting war between two Sumerian cities, Umma and Lagaš, c. 2500–2350 BCE (Cooper 1983). In addition to several royal inscriptions, one episode of this war was also depicted in the famous *Stele of the Vultures* (Winter 2009). Sumerian city-states were frequently involved in military conflicts, and eventually, the entirety of southern Mesopotamia was conquered by one ruler, first by Lugalzagesi from Umma and later by Sargon, the founder of the Akkadian empire. Sargon and his grandson Naram-Suen organised military campaigns to northern Mesopotamia, the Levant and the Zagros Mountains; since that time, the sources describe not only conflicts between various political entities inside Mesopotamia, but also inter-regional military expeditions from and to Mesopotamia (Van de Mierop 2007). A new category of military conflict emerged as rebellions took place in the cities that were formerly conquered (Richardson 2016), starting with the widespread military resistance of the Sumerian cities against the Akkadian kings (cf. Kraus 2018) and ending with the revolt of Babylon against Xerxes, the Persian king, in 484 BCE (Waezegggers 2018). These internal conflicts within the newly established empires may have produced more casualties than regular wars against external enemies, suggested by the inscriptions of two Akkadian

kings, Rimush and Naram-Suen, reporting almost 80,000 deaths when rebellions were pacified (Lemos & Richardson 2023).

During the second millennium BCE, several regional powers emerged in the Near East, with Babylonia in southern Mesopotamia, the state of Šamši-Addu, the Mitanni and the Middle Assyrian state in northern Mesopotamia, Egypt and the Hittite Empire in the west and Elam in the east. These powers fought frequently against each other, but for several centuries, their zones of political control were relatively stable (Bryce 2003). This Bronze Age world suddenly collapsed in the early 12th century BCE, and Mesopotamia was flooded by Arameans, mobile herders who took control over trade routes and hinterland around cities (Liverani 2014).

This 'dark age' in the history of Mesopotamia ended with the emergence of the Neo-Assyrian empire, which not only successfully recovered control over Mesopotamia but also extended for some time over the Levant, Zagros foothills, Elam, and even Egypt. The Assyrian army of that time and many military campaigns were described with detail, and military scenes were frequently depicted in the palaces of Assyrian kings (Malbran-Labat 1982; Mayer 1995; Bahrani 2008). It was a part of the psychological warfare that underlined the cruelty of Assyrians towards their enemies, both outside and inside the state, as the Neo-Assyrian empire was frequently impacted by rebellions of various kinds (Radner 2016). Assyrian kings were successful in presenting themselves as ferocious towards rebels (Lemos & Richardson 2023) and never wasted an opportunity to practice cruelty through flaying, impaling, decapitating, burying alive their victims and heaping the bodies or heads (Richardson 2007)—to such extent that even contemporary bioarchaeologists have been convinced by these depictions (cf. Cohen et al. 2015), even if any actual evidence of particular Assyrian cruelty is lacking. In the sources from the last century of the Neo-Assyrian empire, also severing of body parts, trampling over the dead bodies and grinding the bones of the ancestors were added to this repertoire of spreading terror in Assyrian propaganda (Richardson 2007).

After the fall of Assyria, which had been conquered by Chaldean Babylonia and Media, and after a short episode of the Neo-Babylonian state, Mesopotamia became part of larger empires ruled by the Achaemenids from Persia, Alexander the Great, the Seleucids and the Parthians. For several centuries, northern Mesopotamia was a border area between the West (Roman and Byzantine Empire) and the East (Parthians and Sasanians), and many important combats, such as the battle of Carrhae (53 BCE) and the siege of Dura Europos (256 CE), took place here in the borderland zone between these powers (Gawlikowski 1987). Finally, Mesopotamia was conquered by the Islamic Caliphate in 637 CE and became the heart of the Islamic world during the Abbasid rule (8th–13th century CE). After being demolished and depopulated by Mongols in the 13th century, and then divided into tribal areas by the Bedouins in

the 17th century, this part of the Near East virtually lost its political importance until the beginning of the 20th century (cf. Sołtysiak & Bialon 2013).

Weaponry

Weapons used in combat often evolved from household tools (like axes) or from hunting equipment (spears, arches) (Milner 1999). Even from the most rudimentary weaponry, it is possible to distinguish between hand-to-hand combat weapons (as sticks or clubs) and distance combat weapons (i.e., stones or javelins). For the earliest periods in Mesopotamia, it is impossible to recognise tools that may have been used in combat. Only from the 4th millennium BCE onwards, iconography allows us the reconstruction of weaponry.

Spears or javelins and bows were used for hunting during the 4th millennium BCE, as shown in the *Lion Hunt Stele* from Uruk (Amiet 1980). Mace heads were found in the Late Chalcolithic strata (McMahon et al. 2011), although some of them were quite elaborate and we cannot be sure whether they were used for combat or served as signs of the social rank. The same issue concerns fine stone axes (McMahon et al. 2011). It is possible that slingstones were used in that period, and the discovery of many regular clay pieces in the destruction level at Tell Hamoukar has been interpreted as evidence of a siege (Lawler 2006). Furthermore, flint and obsidian knives may have been used during combat for cutting, which does not leave specific marks on bone if only soft tissues are affected. In general, blunt force (maces, stone axes, stones) and projectile weapons (spears, javelins, arrows) were typical for that time (Moorey 1999), while sharp force weapons were virtually absent.

The 3rd millennium BCE iconography is more specific and it is possible to recognise that spears were the most common weapons, as shown in the *Stele of the Vultures*, the *Standard of Ur* (ca. 2400 BCE) (Wrightson 2012) and other contemporary representations of war from Ebla (Matthiae 1989), Mari (Parrot 1974, Fig. 17) and Kiš (Mackay 1929, Pl. 35). Sometimes axes were used as well, and maces or clubs are depicted in hands of kings and officers as the sign of rank. The earliest representation of bows in a combat scene is the Naram-Suen stele (c. 2250 BCE). Swords were still not used in that time, but there is a peculiar category of sickle-axes, from which swords seemed to evolve in later periods. Such weapons were, however, also associated with high rank (Hamblin 2007). Slingers were not depicted, but slingstones were also used during the 3rd millennium (Eichler 1983).

Towards the end of the 3rd millennium, the Mesopotamian weaponry included lances, spears, javelins, narrow-headed axes, broad battle-axes, mace, daggers, and bows (Hamblin 2007). According to the hymns of Šulgi, the king of Ur (21st century BCE), and in the *Epic of Ninurta*, combat started with the use of arrows, slingstones and clay lumps thrown to the enemy and then spears were used during the

hand-to-hand combat. Only battle leaders were equipped with maces and battle-axes (Wrightson 2012). In that time, metal axes were the most common sharp force tools (Hamblin 2007). Bronze swords appeared in the early 2nd millennium BCE, first in Anatolia and the Levant, and then in Mesopotamia (Gernez 2007). Towards the end of the 2nd millennium, they were replaced by more durable iron swords, and the standard weaponry of the 1st millennium included spears with stone, bronze or iron arrowheads, swords and battle-axes, arches and slings (Malbran-Labat 1982).

Apart from large shields, which were introduced in the Neo-Assyrian period, the protective equipment of Assyrian warriors included conical helmets and leather coats with bronze or iron scales, which may have been used as early as the Bronze Age. During the 7th century BCE, they were gradually replaced by scale-metal jackets (Scurlock 1997).

Military formations

Although battle depictions and descriptions are conventional and not suitable in most cases (perhaps except some Neo-Assyrian sources) to reconstruct the battle tactics, at least it is possible to distinguish between various military formations (Wrightson 2012). During the 3rd millennium BCE, mainly infantry was used in the battle. There are some depictions of four-wheel chariots pulled by onagers, but they were not fast enough for real combat and served rather as command posts or convenient elevated places for javelin throwing (Wrightson 2012). The infantry is conventionally depicted as spearmen, sometimes with axes. There are no representations of archers or slingers before the Naram-Suen stele, but it does not necessarily mean that these formations were not used in earlier Sumerian warfare (Wrightson 2012).

Due to logistics, it is not likely that the professional armies of the Akkadian and Ur III states exceeded 10,000 soldiers (Lemos & Richardson 2023). Lipit-Ištar, the king of Isin (19th c. BCE), had an army of 2000 spearmen, 2000 soldiers with double-axes and 1000 archers (Civil 2003). However, roughly during that time, domesticated horses were introduced into Mesopotamia (Albshir 2025), and two-wheel light chariots pulled by horses became an important battle formation, which was much more mobile and effective during combat than earlier Sumerian heavy chariots (Moorey 1986). As we can learn from historical sources, chariots were the favourite military formation of the Middle and Late Bronze Age states, used to break the infantry lines during battles (Wrightson 2012).

During the Iron Age, chariots were still used, but at least in the Neo-Assyrian army, they were gradually replaced by cavalry, still with spears and arches as main weapons (Postgate 2000; Bahrani 2008; Wrightson 2012), as well as swords or daggers for hand-to-hand combat (Scurlock 1997). The infantry in the Neo-Assyrian period was equipped with large shields, and separate units of shield-bearers were men-

tioned in texts (Malbran-Labat 1982). For example, the provincial army of Meliddu consisted of 150 chariots, 1500 horsemen, 20,000 archers and 10,000 soldiers with shields and spears (Wrightson 2012). Slingers were occasionally mentioned and depicted too, but this formation seemed not to be important (Reade 1972; De Backer 2007), although slingstones were found, for example, in the destruction layers of Lachiš together with many arrowheads (Ussishkin 1982). Battles in the open field were common in the Neo-Assyrian period, but no less important were sieges, and the Assyrian army also included an engineering corps (Fuchs 2008; Nadali 2010).

Recruitment

For most periods in the history of Mesopotamia, the procedures of recruitment to the army are not clear. It may be assumed that at least since the Early Bronze Age, there was a unit of professional soldiers, and a much larger conscript army based on a system known as *ilku*, in which the king granted a field for plant cultivation and requested in return the military service on demand. This system has been described in the *Code of Hammurabi* 26–32 (Harper 1904) and mentioned in some other sources dated to the Bronze Age (Postgate 2000). Some texts from Mari (18th century BCE) specified that herders were also incorporated into the army, but another conscription system had to be applied in their case, as they were members of semi-nomadic tribes (Bonnetterre 1995).

Again, much more is known about the recruitment to the Neo-Assyrian army during the 8th and 7th centuries BCE. It consisted of two royal units and several provincial units, which also included garrisons in major cities and mobile forces guarding the borders (Saggs 1963; Dezsó 2006). The professional army operated over the whole year, e.g. during long-term sieges, but the conscripted part of the army was convened in June, after the harvest, and most military operations ended before winter (Saggs 1963; Radner 2011).

Both the royal and provincial units included Assyrians that served mainly in chariotry and cavalry, and also allies from several Aramean tribes, such as Qurraeans and Ituaeans, who were a large part of the infantry, e.g. more than half of the provincial unit in Mat-Zamua (Postgate 2000). Similar composition of the army was also attested in Elam and Babylonia during that period (Scurlock 1997). At least since the beginning of the 8th century BCE (Nadali 2005), units from defeated states, both infantry and chariots, were also incorporated into the Assyrian army, and were free to keep their ethnic identity (Reade 1972; Dalley 1985; Postgate 2000; Radner 2011). The units of Samaritans and Chaldeans were mentioned among the seven main units of chariotry in the royal army. It is also possible that the service in the army was attractive for mercenaries coming from outside Assyria (Postgate 2000). It may be then safely assumed that the Assyrian army included many soldiers from the Levant (e.g.,

Samarians), Anatolia (e.g., Šinuhtu from Cilicia), Zagros Mountains and southern Mesopotamia (e.g., Chaldeans) (Malbran-Labat 1982; Dalley 1985).

After the battle

Descriptions of the battles in Mesopotamian sources are conventional in most cases, and it is often not clear how many soldiers were slain. One exception is the Neo-Assyrian letter from Bel-ibni, a border unit officer in the marshes of southern Mesopotamia, who reported a battle between 150 soldiers escorting the prisoners of war and ca. 400 enemies. The Assyrians executed 130 captives, killed 17 and wounded 60–70 enemies, and among themselves, 20 people were injured. Even if the number of injured Assyrians was underestimated and the number of enemies overestimated, it is possible that even during such a short encounter, 15–20% of fighters may have been injured or killed (Radner 2011). Very high losses (more than 20,000 men) are noted in one administrative text from Ebla dated to the late 3rd millennium BCE, but in other contemporary sources, the number of dead enemies is much lower, between 100 and 200 (Archi 2010; cf. Nadali 2017), so this high number may be just a scribal mistake.

From the bioarchaeological perspective, it is important to know what happened to the dead bodies after the battle. The *Stele of the Vultures* shows the heap of dead bodies, vultures carrying heads and soldiers with baskets of soil on their heads (Wrightson 2012), which is a highly stylised representation of a battlefield. The inscription by Ur-Nanše from Girsu and more than a dozen later sources (from the period of c. 2500–1700 BCE) mentioned burial mounds created after the battle (Cooper 1983; Richardson 2007). One fragment of a map from Girsu, dated to the Akkadian period, even shows the location of such a burial mound near the river (Selz & Niedermayer 2015). It is not certain, however, how commonly such mounds were created and whether there were any standard procedures for battlefield cleaning.

Some sources dated to the Neo-Assyrian period mention the cleaning of the cities after the siege. Both Sennacherib and Ašurbanipal, who conquered Babylon (and some other cities in southern Mesopotamia), reported that the corpses were scattered all over the streets of the city and scavenged by dogs and swine. Then they were removed outside and cast upon heaps (Eph'al 2009). There are also some Neo-Assyrian texts mentioning that, beyond burning the city, some inhabitants were also burnt at the order of the king. In one of his inscriptions, Ašurnasirpal II stated that during and after the siege of the city Kinabu, 800 soldiers were killed with a sword, 3000 taken captive and burnt together with an unspecified number of boys and girls, and finally a pile was made of their corpses (Lemos & Richardson 2023). If such a treatment was common in the Neo-Assyrian period, layers of burnt human remains should be expected at many archaeological sites of that time.

Mesopotamian kings sometimes took an active part in the battle. Some of them were slain, as for example Ur-Namma from Ur (c. 2100 BCE) or Sargon II from Assyria (705 BCE). It is also common that after a successful siege, the kings of the defeated cities died in the combat or were executed afterwards (Radner 2011). During the battle of Til-Tuba (653 BCE), the Elamite king Teumman died together with his son, and their heads were taken as trophies to Assyria. King's son-in-law was only wounded, but he also requested his own beheading (Bahrani 2008).

Decapitation of dead enemies was frequently described and depicted; in addition to the *Stele of the Vultures*, there are also some passages in a text from Ebla (c. 2400 BCE) (Archi 1998; Catagnoti 2013), depicting a warrior carrying two heads of the enemy (Nadali 2020), and the register of heads in the stele of Daduša, the king of Ešnunna (early 18th century BCE) (Bahrani 2008). From some Assyrian but also much earlier Eblaite sources, we learn that heads of slain enemies were heaped up in front of the defeated city (Radner 2011) or exposed on the city gates (Nadali 2020), although even if this was true, it was likely not the result of mass execution, but rather a collection of heads retrieved from the dead bodies. Heaps of dead bodies are also mentioned in several sources dated to three millennia of documented Mesopotamian history (Nadali 2020).

Expectations

This short review of available historical and archaeological evidence may provide some points for the interpretation of bioarchaeological data. Before the process of urbanisation started at the end of the 5th millennium BCE, all members of the society may have been involved in military conflicts, and therefore a more uniform distribution of weapon-related trauma should be expected in the earlier periods, while during the later periods professional armies were organised. At least since the 3rd millennium, some farmers were still conscripted within the *ilku* system, but it is likely that the royal *ilku* fields were not distributed in a completely random way, so even if survivors from the conscript army returned home with their injuries, the frequency of violence-related trauma should be high in the battle fields, medium in the cemeteries close to the *ilku* fields, and low in places where local people were not involved directly in warfare. In other words, the expected frequency of trauma is more variable between cemeteries than in the period before urbanisation and state formation. There is also the question of mercenaries and soldiers from foreign units incorporated by force at least into the Assyrian army: if they survived and returned home, their healed injuries counted into the frequency of trauma in a population of origin and not in the population they fought for.

Furthermore, the expected categories of trauma changed over time. Throughout the known history of ancient Mesopotamia, spears were the main weapon during

hand-to-hand combat, and the distant combat involved slingshots and bows. Injuries produced by these weapons are not very specific (unless spear or arrow heads are embedded into bone) and may be easily modified by various taphonomic agents. On the other hand, metal axes and swords leave clearer marks on bone, but they did not appear into wider use until the beginning of the 2nd millennium BCE. In the same period, battle chariots were introduced as an important element of warfare, and it may be expected that the risk of multiple fractures increased both for charioteers falling down from the rushing vehicle and for infantry soldiers getting crushed by chariots.

Apart from open field battles, sieges were an important part of the art of war since the first city walls were erected in the 4th millennium BCE. More blunt force trauma and a higher rate of multiple injuries may be expected during a siege, if it is not limited only to the isolation of the city from the hinterland and to negotiations with famished defenders. If the siege was successful, a follow-up massacre of the local inhabitants was likely, producing a high number of bodies with possible skeletal evidence of violence, scattered in the settlement and not properly buried.

Following this review of historical and archaeological sources, the bioarchaeological evidence is presented in the next sections, starting with (very sparse) identification of domestic, social and ritual violence, then moving to the mass graves that may be related to the military conflicts, and finally, a review of identified possible violence-related injuries.

Domestic, social and ritual violence

There is no probable case of the IPV observed in Mesopotamia, but it may be related to the generally poor state of preservation of human remains in arid and semi-arid environmental conditions. Thin and fragile facial bones are usually fragmented and eroded, and in most cases, it is not possible to observe violence-related fractures.

On the other hand, one possible case of the LCIV has been found at Tell Brak (cf. Sołtysiak 2009). The skeleton TW 2658, dated to the Late Chalcolithic 2 (c. 4000 BCE), belonged to an infant that died in the second half of their first year (dental age after AlQahtani et al. 2010). The skeleton was fairly complete, and observed symptoms included fracture of four ribs close to their sternal ends, with marked osteogenic response (**Figure 2**), bilateral active porotic hyperostosis on parietal bones, and irregular lesions along the *linea aspera* of the right femur, which may have been related to the mechanical stress at muscular attachments. These symptoms are consistent with the pattern of the LCIV syndrome, and the presence of the porotic hyperostosis suggests that violence may have been combined with some dietary deficiencies (cf. Walker et al. 2009).

Although many types of death penalty were attested in the textual sources, there are only a few possible examples of the skeletons that may have belonged to the persons convicted to death. Perhaps the most evident is the individual from Uruk, dated to the Chalcolithic, buried on the left side, with hands and legs spread behind the back, suggesting they were tied (Inselmann 2025). Two less clear cases are dated to the 3rd millennium BCE Kiš and Tawi on the upper Euphrates, but they are identified based on a rather imprecise description, without available photographs or drawings (Inselmann 2025). There is also a possibility that the limbs of some individuals who died naturally were tied as a part of some rituals, preventing their return from the Netherworld. This also applied to ca. 30 cases when a skull was missing or misplaced in the grave (Inselmann 2025).

Human sacrifice was not common in Mesopotamia, and the only known possible example is the number of graves at the so-called Royal Cemetery at Ur, dated to the Early Dynastic IIIa, ca. 2600–2450 BCE (Woolley 1934), discussed below. There were also some unusual deposits of neonate skeletons, e.g. at Tell Barri in the third millennium and in Kiš during the first millennium BCE, that could at first sight be interpreted as child sacrifices, however the contextual evidence suggests that, instead, there was in fact a rather peculiar burial rite for stillborn children (Sołtysiak 2010b, 2021; Torres-Rouff & Pestle 2012).



Figure 2. Skeleton TW 2658 from Tell Brak, ribs. Scale bar 1cm. Photograph by Arkadiusz Sołtysiak.

Royal graves in Ur

During many years of excavations in Ur, Leonard Woolley found more than two thousand graves, and 16 of them were identified as the royal burials (Woolley 1934; Moorey 1977; Baadsgaard et al. 2011). At least thirteen of the sixteen contained more than one skeleton, and these additional bodies were usually carefully arranged in the main chamber or an adjacent 'death pit'. In six burials, more than 20 additional bodies were found (Moorey 1977). Most victims were females, but also skeletons of males with daggers and 'charioteers' have been retrieved from some burials.

The grave PG 1237 was well preserved and included an additional 68 female and six male skeletons. Woolley speculated that they voluntarily drank poison and then laid down in regular rows (Woolley 1934). Recently, this interpretation was contested, as the analysis of Woolley's documentation has suggested that at least the females were killed and their bodies carefully arranged (Vidale 2011). A few skulls from this grave were embedded by Woolley into wax, and now they are stored at the British Museum and the University of Pennsylvania Museum of Archaeology and Anthropology. The computer tomography scanning of two skulls from Pennsylvania revealed three lesions, c. 30mm in diameter, two in a male and one in a female individual. They were identified as blunt force (probably battle-axe) trauma following the criterion of the presence of radiating lines (Baadsgaard et al. 2011). However, these lesions and the surrounding fracture lines appear irregular, and may be accidental damage. In either case, the arrangement and presence of two layers of skeletons in the grave PG 1332 (Vidale 2011) makes a quite strong argument that the victims were killed before their deposition, even if no clear traces of violence were noted in these contexts.

There are no cuneiform texts allowing interpretation of this peculiar cemetery nor analogies at other contemporary sites, perhaps with the exception of Kiš, where a few burials with chariots were found, and it is possible that these burials also contained additional bodies, but very poor field documentation does not allow to state this with confidence. The number of additional bodies at Ur decreased with time, and it seems that it was rather an ephemeral tradition that lasted for two or three generations and then disappeared (Baadsgaard et al. 2011). This tradition was neither related to the urbanisation nor to state formation processes, which occurred centuries earlier in Mesopotamia and Ur in the mid-3rd millennium BCE. Ur was already a fully consolidated state with well-established hierarchies, without obvious need to experiment with ritual violence as a measure of social control.

Evidence of military conflicts

The presence of written sources documenting several millennia of the Mesopotamian history sometimes enables establishing a direct link between human remains with

traumatic lesions or mass deposits of human remains and particular events in the history of the region. Walker (2001) noted a possible correlation between the intensity of violence and climatic conditions, and in the case of Mesopotamia, two possible outbreaks of drought were attested at the transition from the Early to Middle Bronze Age (Cullen et al. 2000) and at the transition from the Bronze Age to the Iron Age (Langgut et al. 2013). However, both these ‘dark ages’ are relatively poorly documented, and it is easier to find links between history and bioarchaeology for periods when military activity was purportedly less related to the environmental conditions.

Early urbanisation

During the Late Chalcolithic 3 (ca. 3800–3600 BCE), the city of Tell Brak grew to more than ca. 130 hectares, and it was a fully developed urban centre at that time, with large public buildings and craft specialisation (Oates et al. 2007). At the northern outskirts of the city, in a small mound known as Tell Majnuna, rescue excavations unearthed a midden containing, among others, several clusters of commingled human remains and a cemetery on the top (Sołtysiak 2010a; McMahon et al. 2011). A series of radiocarbon dates range from ca. 3700 to 3400 cal. BC, which fits within the period of maximum growth of the city. Most clusters included bones heavily scavenged by carnivorous animals, but they were variable in respect of sex, age-at-death and the pattern of remaining articulations. One cluster (Area MTW) contained skeletons with many articulations present, adult individuals and males prevailed (**Figure 3**), while the other (Area EM) included mainly almost completely disarticulated bones of women and children, but not infants (Sołtysiak 2010a).

As human activity at the midden continued after the deposition of both clusters and, moreover, bones found in the Area EM were removed from another place, there were several examples of postmortem damage, but no clear case of perimortem trauma. On the other hand, as many as 11 healed cranial lesions were observed, which makes ca. 17% of individuals, calculated as the sum of preserved areas of the cranial vault (Sołtysiak 2010a). Both sexes were affected, and the size and shape of the lesions were variable, from small point injuries and oval depressions to longer, regular lines. Most cases (10 per 11) came from the Area MTW (Sołtysiak 2010a).

The secondary (or even tertiary) character of these deposits makes any interpretation difficult. The pattern of scavenging suggests that the bodies were exposed for several weeks or months and then collected and buried at Tell Majnuna. However, they were not necessarily slain, as an episode of increased mortality due to famine could also be a possibility (Sołtysiak 2010a; Sołtysiak et al. 2017). In either case, the relatively high frequency of healed cranial injuries in the deposit from Area MTW suggests the presence of inter-personal violence in the period of early urbanisation, even if these people were wounded far away from Tell Brak.

Although Tell Majnuna seems at first sight to be a possible example of the burial mound that was relatively frequently mentioned in the late 3rd and early 2nd millennium BCE Sumerian texts (cf. McMahon et al. 2011), the chaotic pattern of the clusters of human remains that were distributed at different levels in different excavated areas makes such an interpretation not very likely. It rather seems that partially scavenged bodies were disposed of in the midden without any clear intention to set up any memorial place. However, there is an example of a clearly intentional monument serving also as a burial place. This is the so-called White Monument near the site of Tell Banat, dated to the 3rd millennium BCE (Porter et al. 2021).

The White Monument is a mound 100m in diameter, 22m high and therefore very well visible in the plain north to the site of Tell Banat. It was constructed



Figure 3. Cluster of human skeletons during excavation; Area MTW at Tell Majnuna.
Photograph by Arkadiusz Sołtysiak.

in three phases, but the oldest phase C remained unexcavated. During phase B (ca. 2700/2600–2450 BCE), a series of small tumuli was superimposed on the previous mound. All of them contained completely disarticulated and highly incomplete remains of 2–5 individuals together with animal bones and pottery sherds. Both subadult and adult elements of both sexes were present (Porter et al. 2021).

During phase A (ca. 2450–2300 BCE), the mound was expanded with the construction of several steps or small terraces. The deposit contained human remains scattered in at least 22 clusters; all of them were highly fragmented and incomplete. The minimum number of individuals per cluster ranged from one to three. The age-at-death pattern was quite unusual, with the majority of individuals classified as 8–10 to 20 years old. Many equid bones, biconical clay pellets and sherds were also identified there (Porter et al. 2021).

Without excavating the oldest phase, it is difficult to interpret this unique assemblage of human remains. The excavators speculate that the White Monument contained bones collected from the battlefield long time after the battle, and for that reason, they were fragmented and incomplete (Porter et al. 2021). However, there is no available evidence of any weapon-related trauma, and the age-at-death pattern does not clearly indicate the predominance of adult males; therefore, the identification of this site as the burial of the warriors is not convincing.

The Akkadian empire

If we neglect the Uruk expansion in the fourth millennium BCE, which seemed to be associated with violence in a rather limited way (cf. Algaze 2005), the first outbreak of large-scale military activity in the whole of Mesopotamia and beyond may be dated to the time of expansion and collapse of the Akkadian empire, ca. 2350–2200 BCE (McMahon 2012).

One site where an assemblage of human remains with a high incidence of trauma was associated with the collapse of the Akkadian empire is Titriş Höyük in the Euphrates valley. In a plaster basin dated to the late EBA (ca. 2300–2100 BCE), disarticulated remains of 19 individuals (16/19 adults) were found in a secondary deposit. In this assemblage, two healed lesions were observed and as many as 26 perimortem injuries. Two healed cranial fractures were oval and identified as blunt force trauma, and the perimortem lesions were all classified as sharp force trauma or projectile trauma (Erdal 2012). Postcranial bones were not examined, as they were affected by taphonomic agents. Most lesions (61% in Erdal 2012, but 19/26 = 73%) occurred on parietal bones, and there was no significant difference between the right and left sides. Two kinds of weapons were identified: battle-axes producing canoe-shaped fractures and spears or daggers producing oval fractures (Erdal 2012).

For comparison, crania from regular cemeteries were also studied, and this collection included 15 individuals dated to the early and middle EBA and 35 individuals dated to the late EBA. In the earlier sample, one healed blunt force trauma was observed, and in the later sample, there were three healed lesions and three penetrating unhealed wounds, both in male and in female individuals (Erdal 2012). If the number of healed traumas is roughly similar in all three samples, the number of perimortem lesions in the plaster basin seems to be much higher, and Erdal (2012) has interpreted this as evidence of a massacre during the collapse of the Akkadian empire.

This evidence is, however, ambiguous. First, the identification of perimortem trauma was based only on one criterion, i.e. the colour of fractures (Erdal 2012), but this allows only differentiation between recent and old damage and not between perimortem trauma and postmortem damage (cf. Walker 2001). Available pictures (Erdal 2012) show right angles on fractured margins, and no traces of peeling (instead, there is bevelling on the inner and outer table), or attached fragments and irregular fracture patterns, which is typical for postmortem damage. Second, the observed pattern of perimortem trauma is completely different from the pattern of antemortem trauma: in the former case, only sharp force weaponry was suggested, in the latter case, no sharp force injuries were observed (Erdal 2012). Perhaps it is more likely to survive an attack with blunt force weapons, but this contrast between healed and supposedly unhealed lesions is at least suspicious.

Finally, bones found in the plaster basin at Titriş Höyük were a part of a secondary assemblage, which implied that they were transported from elsewhere. Therefore, damage due to digging, sorting out, and transportation may be expected, but it has not been taken into account in the differential diagnosis of this case (cf. Erdal 2012). Actually, two types of damage observed in the plaster basic assemblage at Titriş Höyük may be easily associated with two types of tools used for digging in the Near East during the Bronze Age, i.e. hoes with stone or metal blades (Cauvin 1979; Potts 1997; Moorey 1999) or wooden pick-axes (cf. Janick 2007, Fig. 5). It does not mean that there are no perimortem injuries in the collection from Titriş Höyük, but these crania need more careful differential diagnosis before their interpretation as the evidence of a massacre.

Battles of Tuttul

Tuttul (modern Tell Bi'a) during the Early and Middle Bronze Age was a capital city of a small kingdom in the upper part of the middle Euphrates valley. Cuneiform texts from the Old Babylonian period reported three military campaigns, during which Tuttul was sieged and conquered, first by Šamši-Addu, then by Zimri-Lim from Mari and finally by Hammurabi from Babylon. All these three sieges occurred in the first half of the 18th century BCE.

Destruction layers connected with the attack by Šamši-Addu contained ca. 80 skeletons that were thrown into an unfinished royal hypogeum and then buried (Figure 4). At the bottom, only male skeletons were present, but the upper layers of the bodies also included females and children; therefore, the siege likely ended with the massacre of local inhabitants. No traces of Zimri-Lim's siege were found, but the last phase of the palace ended with a destruction layer which may be associated with Hammurabi's campaign. This layer contained the skeletons of ca. 30–40 individuals distributed in quite a random way along the eastern wall of the palace, but it is not certain whether they were defenders or attackers (Miglus & Strommenger 2007; Miglus 2008).

The final osteological report for Tell Bi'a has not been published yet, but two cases of trephination have been discussed in detail (Wolska 1994). However, one of them may be rather a well-healed compression fracture of the cranial vault, and the second seems to be perimortem trauma or even postmortem damage. If any attempt of medical treatment occurred here, it was very limited. In spite of the lack of direct bioarchaeological evidence, the archaeological context is rather unambiguous in this case, and the assemblage of human remains from Tuttul are the oldest clear example of a burial following a military conflict in Mesopotamia.



Figure 4. Scatter of skeletons from Tell Bi'a. Courtesy of Eva Strommenger and Peter Miglus.

The fall of Assyria

For more than a millennium after the battles of Tuttul, there are no known assemblages of human remains that may be directly associated with military conflicts, and the next case is dated to the time when the Assyrian Empire collapsed, defeated by the Babylonian-Median coalition during several campaigns between 616 and 605 BCE. The capital cities of Nineveh and Aššur were captured, and destruction levels from this event have been found during archaeological excavations.

The most spectacular discovery was the ruins of the Halzi Gate and the Adad Gate in Nineveh. The Adad Gate was excavated by the Iraqi mission in the 1960s, and several skeletons were found both inside and outside of the gate, but no further details are available (Pickworth 2005). The Halzi Gate was excavated in the 1990s, and the destruction layer contained remains of 12 individuals in the central passageway and a skeleton of a horse, together with a few human bones outside the outer entrance. The remains of the other gates of Nineveh did not contain any skeletons (Pickworth 2005).

Only a few preliminary notes about human remains from the Halzi Gate are available, and some of them are rather confusing or speculative, like e.g. the identification of the individual 2 as a 12–13-year-old male who was small for his age (Pickworth 2005). However, in at least two individuals, healed cranial trauma was present, and an arrowhead was embedded in one fibula. Some perimortem fractures were observed, as well as several iron and bronze arrowheads scattered among the skeletons. Many noted fractures may have been caused by the falling tower walls. Some unspecified markers of occupational stress were scored in some individuals who were identified as archers, but the actual base of this interpretation has not been explicitly stated (Pickworth 2005), and therefore it should be considered speculative.

Even if some elements of these preliminary notes are ambiguous, the archaeological context and the arrowhead embedded in bone make a strong argument in favour of the interpretation that these individuals died during the final siege of Nineveh and were covered by a falling tower. However, radiocarbon dating of bone samples produced a consistent set of dates covering the late 9th and early 8th century BCE, and these dates precede not only the fall of Nineveh by almost two centuries but also the construction of the gate itself, built in the early 7th century BCE (Taylor et al. 2010). There is no rational explanation for such inconsistency, and therefore, the true context of the human skeletons at the Halzi Gate remain an open question.

The evidence from Aššur is no less ambiguous. In a residential area, a human bone scatter has been found close to the soil surface, as if some remains were left on the surface and then scavenged and scattered by animals. However, due to the shallow deposition, these bones were heavily affected by various diagenetic effects, and all possible traces of scavenging were ambiguous; there is also a possibility that

these bones came from plundered graves (Sołtysiak 2015). In two skeletons found in regular graves, possible perimortem trauma to the skull was present: a large circular fracture with radiating lines in the left frontal bone of a young male (Figure 5) and also a linear fracture of the left frontal and temporal bones of a female, together with a circular lesion in the right frontal bone. However, both individuals were buried in coffins that were shorter than their bodies, so it is also possible that this damage occurred during the burial (Sołtysiak 2002, 2015). Therefore, surprisingly, in spite of intensive archaeological research in the capital cities, there is no clear bioarchaeological evidence for the fall of Assyria.

Siege of Dura Europos

Again, another assemblage of human remains that may be linked to a military conflict, dates many centuries after the fall of Assyria. The city of Dura Europos was captured by the Persians ca. 256 CE, and several traces of the siege have been recorded during excavations directed by Robert du Mesnil du Buisson in the 1920s and 30s. The most interesting discovery was the Persian mine and the Roman countermine close to Tower 19. The latter contained heaped skeletons of more than a dozen Roman soldiers and one Sasanian soldier with burnt legs. James (2011) suggested that Romans were poisoned with smoke by the Persians, and the attackers then used this opportunity to destroy the countermine, but one of them died during this operation. Unfortunately,



Figure 5. Skeleton Gr-30 from Aššur, cranium. Courtesy of Peter Miglus.

all bones were reburied after excavation in an unknown location, and the original excavation notes and drawings are not completely clear, so this interpretation remains speculative (Campbell 2012).

Apart from this spectacular assemblage, in the ruins of Dura Europos, excavators discovered additional human skeletons that may have been evidence of the stronghold's capture by the Persians. There was one burial of a soldier at the city's rampart, two skeletons found directly in the floor in city block E8, including one with armour, and two skeletons directly in the floor of the Zeus Dolichenus temple, although they may also be later burials interrupting the destruction level. The situation is not clear because the documentation is scarce, and the skeletons were also missing after the excavations. However, it is likely that during the last siege of Dura Europos, the civilians were away and therefore there are not many traces of fighting in the residential areas of the city (Baird 2012).

Weapon-related injuries

Apart from those very few sites where scattered or commingled human skeletons may have been more or less directly linked to some historical battles, there are also several examples of possible weapon-related trauma at regular cemeteries. They include mainly antemortem and perimortem cranial trauma, and lesions in postcranial skeletons were much less frequently noted by the modern investigators. It is noteworthy in this context that healed fractures at Mesopotamian sites were more frequent in the upper than in the lower limb, including hand and foot bones (Sołtysiak 2012), and it is possible that this difference, at least to some extent, reflected the prevalence of violence-related injuries among these traumatic lesions.

Among possible reasons for trephination, there is also an attempt to clean cranial injuries. However, trephinations were very rare in Mesopotamia: there are only a few examples, such as a rhomboid lesion from Ebla (Tell Mardikh) dated to the Middle Bronze Age (Mogliazza 2009), two much less clear cases from Tuttul (Tell Bi'a) (Wolska 1994) discussed above, and single ones from Bakr Awa (Fetner 2014), Tell Mohammed 'Arab (Bolt 1991), as well as Tell ed-Der (Burger-Heinrich 1989b). Therefore, even if some cranial injuries were not properly distinguished from trephinations, it should not considerably affect the general picture.

The oldest example of cranial trauma in Mesopotamia is four healed oval lesions in a small assemblage from the Pre-Pottery Neolithic cemetery in Zawi Chemi – Shanidar; two in an adult male, one in an adult female and one in an adolescent individual. Originally, they were interpreted as evidence of trephination (Ferebach 1970), but later examination classified them as blunt-force trauma (Agelarakis 1993). Other Mesopotamian sites from that period, such as Nemrik 9 (Sołtysiak et

al. 2015) and Tell Abu Hureyra (Molleson 2000), contained no skeletons with evidence of violent trauma, perhaps except for a greenstick fracture of the ulna with associated hematoma in a juvenile skeleton from Abu Hureyra (Molleson 2000). The evidence from the Late Chalcolithic site of Tell Majnuna, with many examples of cranial trauma, has been discussed above.

During the Early Bronze Age, violence-related injuries were present at several sites, including Titriş Höyük (see above). At Hassek Höyük, a cemetery dated to the EBA I, a mature male individual had a slight and well-healed oval depression 6.4×7.8 mm on the frontal squama, which was interpreted as the effect of cauterisation with a bronze chisel (Parsche & Ziegelmayer 1992). In mass burials from Tell Banat, two perimortem traumas to the skull were noted, one 2.8×1.2 cm on the frontal bone of a young male and the second 1.3×0.4 cm on a fragment of parietal bone. Both depressions are sharply defined, but without radiating fracture lines (Wilhelm 2006). The first of them has been associated with a slingshot and the other with a pointed weapon. Two healed cranial injuries (both on the left side) were also noted at roughly contemporary Tell Chuera (Wahl 2010). Nothing but one fracture of the left ulna was found at Tell Leilan (McKenzie 1999). A skeleton of a warrior has been identified at Terqa (Tell Ashara) based on the presence of trauma in the humerus (Tomczyk et al. 2011), but it is much more likely that this lesion was a postmortem cutmark (Sołtysiak 2014) and therefore the whole interpretation of this individual's engagement in combat activities is speculative.

The evidence from the Middle Bronze Age is much scarcer. At Tell Ashara (middle Euphrates valley), a skeleton of a 40–45-year-old male individual was found. He had healed but malaligned fractures in at least ten ribs, left clavicle and left fibula (Figure 6). Such a pattern of massive fractures may be the result of a civilian accident (Sołtysiak 2002b), but a fall from a battle chariot is also a possibility in that chronological period. Another male individual with multiple healed fractures (right ulna and left tibia) was buried at Tell ed-Der (central Mesopotamia) during the 21st century BCE (Burger-Heinrich 1989b).

Two healed cranial injuries occurred in the Middle Assyrian assemblage from Tell Mohammed 'Arab: one small hole at the coronal suture of a female and a small depressed area with a raised margin above the external occipital protuberance in a male individual. Another large oval hole with some signs of healing in a juvenile was classified as possible trephination (Bolt 1991). No cranial injuries occurred at contemporary Halawa, but there was one fracture of the ulnar shaft (Orthmann 1981).

Multiple healed injuries were noted in the male individual 1HYT93 from Tell Yelkhi (Doro Garetto et al. 2007), however, the dating of this skeleton has not been specified, and the number is not present in the catalogue of burials from that site (Fiorrina 2007). It may be only speculated that the proper number should be 1HYT9A,

and it was a burial dated to the Kassite period (LBA). The pattern of injuries included depression ca. 2.2cm in diameter on the right parietal, close to the sagittal suture, fracture of the right clavicular shaft and some healed lesions at the right scapula (Doro Garetto et al. 2007).

Apart from the evidence from Nineveh and Aššur (see above), very few examples of violence-related injuries were found in the skeletons dated to the first half of the first millennium BCE. At Tell Afis, the cranium of a male mature individual had three healed lesions on the parietal and left temporal, one interpreted as the result of a blunt-force attack and two as the result of a sharp-force attack. One of these lesions



Figure 6. Skeleton TQ22 F219 from Tell Ashara: (top) ribs, (bottom) clavicle and fibula. Photographs by Arkadiusz Sołtysiak.

was 7cm long. In the left distal radius of this individual, a Colles fracture, typically resulting from breaking a fall, was present (Cenni 2006). Two areas of new bone formation in tibiae from Arbil (Neo-Assyrian period) were identified as the result of blunt force trauma (van Ess et al. 2012), but such conditions are more likely the result of accidents or even fatigue. One healed fracture of the ulna was noted in a male from Isin, dated to the Neo-Babylonian period (Ziegelmayer 1981).

A small number of possibly weapon-related injuries were noted at the large Roman-Parthian cemetery at Tell Šeh Hamad (ancient Magdala). One 60–70-year-old male had a round depression ca. 2cm in diameter on the frontal bone, and another mature male exhibited a similar injury on the left parietal bone (Witzel et al. 2000; Jungklaus 2010). Two fractures of the ulna at this site were identified as parry fractures (Jungklaus 2010). At Meskene Qadima (Late Roman / Islamic cemetery), one mature male exhibited a lesion on the left side of the skull, in the early stage of healing, and traumatic hip dislocation with necrosis of the femoral head (Krafeld-Daugherty 2010). High incidence of trauma was noted in the Late Roman / Islamic cemetery at Titriş Höyük (6 per 22 individuals), but no details are provided. One picture shows evident healed cranial trauma (Honça & Algaze 1998), but in other cases the purported reaction to trauma looks like postmortem erosion.

In the Islamic cemetery at Isin, one male survived an attack with a sharp-force weapon, possibly a sword, which left a linear healed lesion 5cm long close to the right coronal suture on the frontal bone. The same individual had healed fractures of the left tibia, fibula and one metatarsal. Nasal bones of another male individual from this cemetery exhibited healed fracture (Ziegelmayer 1992). Parietal thinning was diagnosed in one Islamic individual from Tell Sabra (Burger-Heinrich 1989a), but the picture shows an irregular feature, and it is not certain whether the condition was symmetrical. It looks rather like a well-healed large trauma or a trephination hole, but the low quality of the published photograph prevents any decisive diagnosis.

During exhumation of recent (i.e. late 19th / early 20th century) burials at Tell Barri, perimortem sharp force trauma was noted in a mature male individual. This large damage exhibited evidence of peeling and a regular fracture line (**Figure 7**) which was not done during excavation. Another old male individual from this cemetery had his left leg amputated at the proximal 1/3 of the femur, and most likely died soon after this operation, as the evidence of healing is minimal. This amputation was, however, not necessarily associated with any combat wound.

Among 25 healed cranial lesions from the Bronze Age and later periods, as many as 19 were observed in males and only three in females. Even if there is possible bias due to sex assessment methods (cf. discussion in Sołtysiak 2010a), the prevalence of males is likely. Side of the traumatic lesions was noted only in a small number of cases, but some dominance can be attested to the left side (six to two), which also

suggests that violence-related trauma prevails in this heterogeneous sample, assuming that most attackers are right-handed and attacked head-on. Most lesions are oval in shape, and only a few examples of linear fractures indicating sharp force trauma were noted, all dating to the later periods. Some small lesions were interpreted as arrowhead or spearhead injuries (Sołtysiak 2017).

The analysis of temporal trends in the frequency of healed cranial trauma is very difficult, as the trauma recording protocols in reports produced by various authors were variable and the sample is heterogeneous and far from being representative (Sołtysiak 2017). However, at least some general observations may be made. In the sample of 1278 individuals from 38 sites/periods where at least 8 complete crania were found, 31 antemortem lesions were recorded in 28 individuals, and the overall frequency is 2.2%, with decreasing trend from the Chalcolithic to the Middle Bronze Age, then slightly increasing in the Late Bronze and Iron Age (including the Neo-Assyrian period) and relatively low in the later periods. In general, the frequency in the Chalcolithic and the Early Bronze Age was above 4%, while in all later periods it did not exceed 2.5% (Sołtysiak 2017). Also, a higher frequency was noted in the northern peripheries of Mesopotamia than in the core area, suggesting that the areas under more strict political control were less affected by inter-personal trauma (Sołtysiak 2017).



Figure 7. Skeleton from the modern cemetery at Tell Barri, cranium. Photograph by Arkadiusz Sołtysiak.

The most recent study covering more than 3500 individuals from the whole Near East revealed roughly the same pattern in different regions, with decreased frequency of the ante-mortem cranial trauma after the Chalcolithic, then a relatively low number of lesions in the Early and Middle Bronze Age and some increase during the Late Bronze and Iron Age. Such a pattern has been interpreted as the consequence of the strengthening of the central administration during the EBA and MBA and then its weakening in the 'dark age' of the LBA and IA (Baten et al. 2023).

Discussion

The results of this review are slim when we consider the abundance of textual sources and the long history of regional archaeological research. There is virtually no evidence (neither positive nor negative) of domestic, social and ritual violence, which is in contrast with Mesoamerica (González & Tiesler 2022; Scherer 2017) or even ancient Egypt (Gresky et al. 2023; Wheeler et al. 2013). Warfare in Mesopotamia is relatively well-known owing to the historical documents, but the potential of a few excavated assemblages of human remains associated with known historical events has not been exploited in full. Skeletons from several sites are no longer available (Dura Europos, Nineveh) or reports on them have not been published, although many years have lapsed since excavation (Nineveh, Tuttul). The evidence from other sites (Titriş Höyük, Aššur) is ambiguous due to taphonomic agents or not completely consistent with the pattern expected for warfare (Tell Majnuna). Therefore, bioarchaeology has contributed to a better understanding of known historical events only in a very limited way.

The problem with differential diagnosis

In most bioarchaeological reports covering Mesopotamia, violence-related trauma in the postcranial skeleton was diagnosed superficially or not at all, as blunt-force injuries may be easily mistaken with accidental fractures, and sharp-force injuries were virtually absent. Safer, although still problematic, is the diagnosis of healed cranial injuries. The quantitative analysis of data gathered from various sources produced two results: such trauma was more common in males and more common before the end of the 3rd millennium BCE (Sołtysiak 2017). Although the sample is heterogeneous and not representative in any way, this pattern may reflect a real change in warfare. According to the historical and archaeological sources, around the beginning of the Middle Bronze Age, swords and metal axes became much more common, and chariotry emerged as an effective military force. Therefore, it is possible that (1) crania since that time were less frequently targeted during combat or (2) metal blade wounds were more frequently lethal and therefore the number of survivors decreased with their

prevalence. Furthermore, the introduction of leather and then metal helmets during the Bronze Age provided some protection against injuries. On the other hand, however, the lower number of cranial trauma at cemeteries may also be related to the professionalisation of armies and to a lower share of conscripted local people who were buried at local cemeteries. Moreover, in that time, military campaigns more frequently involved distant marches, and this inter-regionalisation of warfare may have contributed to the change in the pattern of cranial injuries (cf. Sołtysiak 2017).

Several weak points of research on violence in past human populations have been identified here. First, when perimortem trauma is noted, usually taphonomic agents are not discussed, and a proper differential diagnosis is lacking. If secondary deposits are studied, such as at Tıtrıř Höyük, the presence of postmortem damage must be discussed in detail. Second, in the case of antemortem trauma, blunt-force injuries noted in the postcranial skeleton are not easily differentiated between violence-related and accidental fractures. Sharp-force trauma is clearer, but it was very rare in Mesopotamian collections of human remains. Thirdly, in the case of healed trauma to the skull, differential diagnosis is usually also lacking, although weapon-related injuries may be mistaken for trephination or parietal thinning, especially if only cranial fragments are available.

Another problem is the overall interpretation of the observed pattern of trauma. Perimortem and antemortem injuries provide different kinds of information, as the former are present in non-survivors who, in most cases, were buried not far away from the place of death, and the latter are present in survivors who may have been buried in a distant place. For example, the battle of Carrhae was fought in Mesopotamia, and dead bodies were most likely buried at the battlefield, but survivors (both Romans and Parthians) continued their military service elsewhere, and most of them were buried far away from Carrhae, probably in places scattered all over the Roman and Parthian territory. Therefore, their injuries would not be helpful in any reconstructions of the pattern of violence in the place of their discovery, and, on the other hand, the supposed mass burial at Carrhae would not be helpful in research on violence in the local Mesopotamian population.

Two different pictures of violence in Mesopotamia

If we read the cuneiform texts, the violence and especially warfare is not commonly mentioned in the Early Dynastic period, perhaps except the state of Lagař, but since the Akkadian period violence became the attribute of power (Richardson 2016) and many mentions and depictions of violence (especially warfare) make an impression that it was prevalent experience in Mesopotamian societies, with a peak in the Neo-Assyrian period when kings became obsessed with expressing violence as the main tool of social and inter-state policy. However, if we consider only bioarchaeological evi-

dence, a relatively contrary picture emerges, with a higher prevalence of inter-personal violence up to the third millennium BCE and a much lower prevalence in later periods (Sołtysiak 2017), with only a small increase when the Neo-Assyrian empire flourished (Baten et al. 2023). On one side, it may suggest that the textual evidence of violence should be interpreted with caution, and the prevalence of violence in official state propaganda was more a social policy tool and less a reality of contemporary societies. Moreover, it is likely that after the establishment of regional states, violence became focused on professional soldiers, affecting other segments of society less. On the other side, however, changes in violent behaviour with time may also make any interpretation of temporal trends in the frequency of observed trauma highly biased.

If we look for a broader picture, also in other regions of the Near East, the frequency of trauma was relatively high during the Early Bronze Age, as we learn from the research on large cemetery at Bab edh-Dhra', Jordan (Gasperetti & Sheridan 2013) and from the review of bioarchaeological evidence of violence in Anatolia where three EBA sites with organized violence were identified (Erdal & Erdal 2012). However, in later periods, the overall frequency of trauma in Mesopotamia seems to be lower than in neighbouring regions. For example, Rathbun (1984) observed that cranial injuries were more common in Iran. In Armenia during the Bronze and Iron Age, violence-related trauma was more common and included healed cranial trauma, nose fractures (more frequent in females) and a case of a projectile embedded in bone (Khudaverdyan 2010, 2014, 2023). This is, however, still a quite superficial comparison.

The most robust review of violence-related trauma in SW Asia indicates that its frequency in Mesopotamia was 6.0%, lower than in Anatolia (8.1%) and the Levant (9.4%) and much lower than in Iran (18.6%), acknowledging, however, a relatively low sample size in the last region (Baten et al. 2023). The temporal pattern in all these regions is similar, with a clear decrease in traumatic lesions during the Early and Middle Bronze Age (Baten et al. 2023).

In Harappa, the frequency of (often multiple) cranial trauma was 15.5% in adult individuals, conversely a bit higher in females, and much more common in the post-urban than the urban cemetery (Robbins Schug et al. 2012). Therefore, although this figure has been originally interpreted as the effect of early state formation, the high prevalence of trauma is in fact related to the collapse of the urban civilisation. Although in Mesopotamian history several cycles of regional development and collapse have been identified (Ur 2010), there is no evidence of their correlation with the frequency of trauma. Especially the collapse of the Akkadian and Ur III states, sometimes considered as the consequence of major climate deterioration (Sołtysiak & Fernandes 2021), does not coincide with a higher risk of cranial injuries. In general, the bioarchaeological evidence suggests that Mesopotamia and especially its core area was a much safer place than the other parts of the Near East, even if widespread

royal propaganda of bloody battles and rage against the enemies suggests something obverse.

Conclusion

The output of this review, indicating all problems with diagnosis and interpretation of the violence-related trauma, shows well that the analysis of the pattern of violence using bioarchaeological data is very difficult, even if the historical background is relatively well known. Moreover, violence arouses emotions and speculations about violent behaviour in the past are always an attractive part of archaeological stories, even if the evidence is ambiguous at best (cf. Tomczyk et al. 2011; Erdal 2012). Taking all this into account, we see that the current state of bioarchaeological evidence of trauma has rather limited value in researching the history of violence in Mesopotamia.

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